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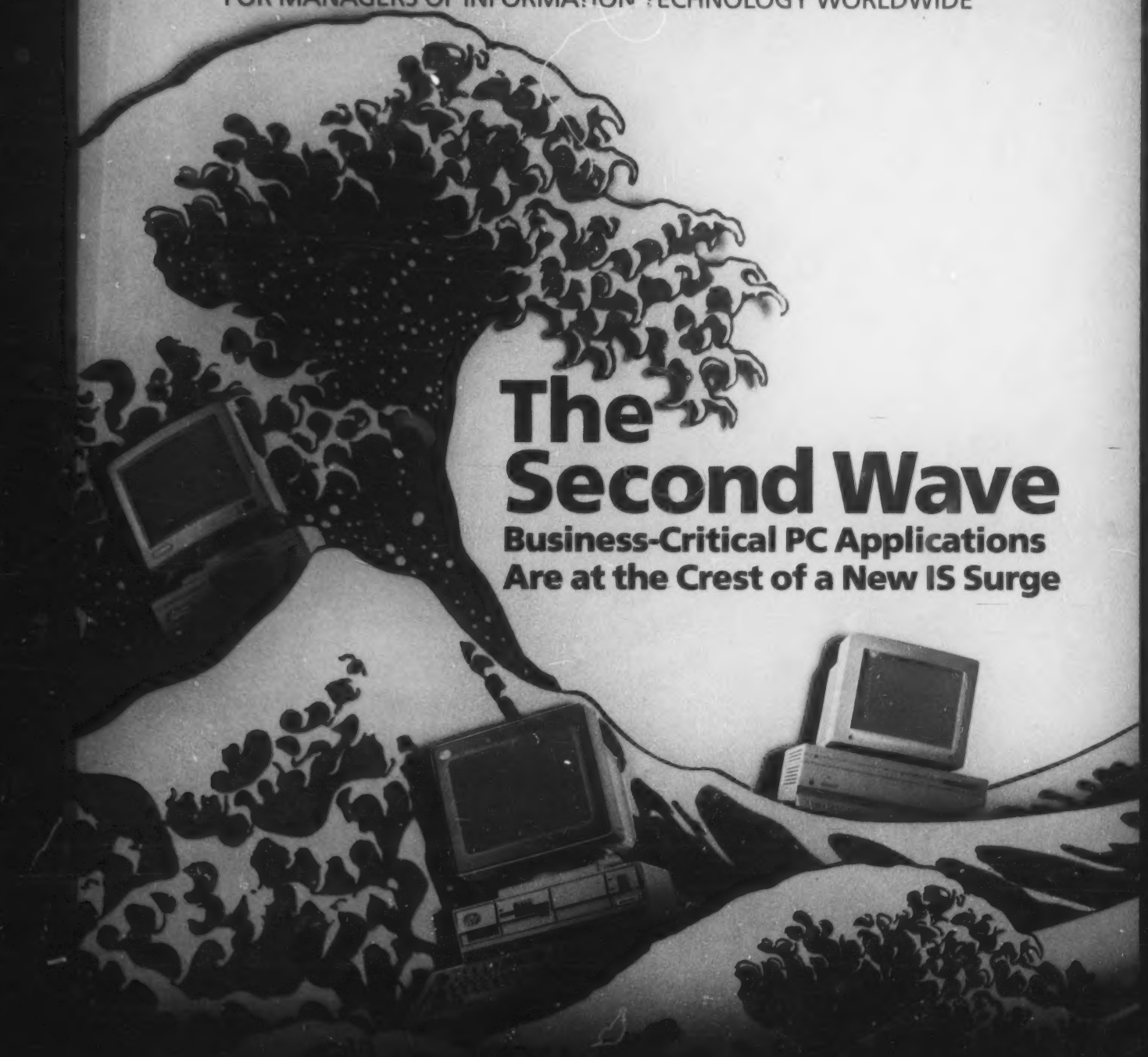

The Second Wave

Business-Critical PC Applications Are at the Crest of a New IS Surge

How to Make CASE Keep Its Promise
A New OLTP Benchmark Standard

New CICS Out of IBM
In Defense of SQL

FEB 1, 1989

VOLUME 35
NUMBER 3

DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

The Second Wave 14

BY JEFF MOAD Companies can be washed away by the knowledge that many of their most irreplaceable applications are PC-based and end-user controlled. Failure of these applications could threaten a company's very existence. As these company-critical applications replace task automation as the biggest trend in PC use, most companies are looking for a better way to manage development and support of those systems. Companies are often slowing their PC buys in the process.

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Cover Photography by Walter Wick

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INSIDE DATAMATION

The Issues of the Day

When DATAMATION started its Issues series last year, our intent was to focus on the most important management, systems, and organizational IS issues facing users. We are continuing with this series, and the first installment of the year, "The Second Wave," on p. 14, deals with the role of personal computers in IS.

San Francisco Bureau Manager Jeff Moad, the author of the article, puts the issue into perspective: "As divisions, departments, and business units continue to increase PC spending and to build more company-critical applications around PCs, most companies are looking for a new and better way to manage the development and support of those systems. They are putting an end to the often ad hoc, disjointed approach to PCs that evolved in the early to mid-1980s. This second-wave approach to PC-based systems has companies insisting . . . that they conform to standard development methodologies and consciously link these new applications directly to specific business objectives, not just to some vague notion of personal productivity."

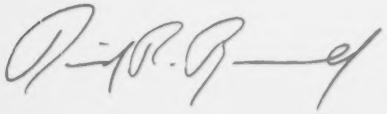
Photograph by Jeff Reinking

DATAMATION'S JEFF MOAD, San Francisco Bureau Manager, has been covering the industry for the last 10 years.

This story has much relevance to you, the IS manager, because it brings into focus the key systems/management/organizational relationships in the use of PCs. It is no easy challenge to provide this kind of analytical synthesis, but Moad, who has been covering the use of information systems for more than 10 years, was a natural to take on the job. Of course, this meant he had to put aside a couple of his favorite pastimes—traveling to baseball training camps to watch the players work out, playing the odds at his favorite craps table (he is a former Lake Tahoe croupier), and watching old Clint Eastwood *Dirty Harry* movies—but he promises to return to them with a vengeance now that the story is done. The leisure world's temporary loss, we trust, will be your gain.

Also in this issue is the first of a two-part rebuttal to a two-part article we published last summer called "Fatal Flaws in SQL," by E.F. Codd, the father of the relational model. Written by David Beech while he was at Hewlett-Packard Laboratories in Palo Alto, the article (on p. 29) comes to the defense of SQL and tries to poke holes in some of Dr. Codd's arguments. In our next issue, Beech will offer some suggestions to extend and improve what has become a standard in languages.

Other articles of note in this issue include one by consultant Omri Serlin on a new standard for OLTP benchmarking (p. 47) and one by our intrepid San Jose Bureau Manager Susan Kerr, called "New CICS Out of IBM" (p. 59). Serlin, the founder of a vendor council on transaction processing performance, details what the council is doing to evolve the original DebitCredit benchmark, specifications for which were first published by DATAMATION in 1985. Kerr gets inside IBM's recent statements of direction for CICS, including a new code base that will operate in MVS/ESA environments, and puts into perspective what the new CICS will mean for users.



—David R. Brousell, Executive Editor

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The Second Wave

PC use is still rising, albeit more slowly, as companies realize the importance of today's end-user systems and decide how best to manage and protect them.

BY JEFF MOAD

Top executives at Palo Alto-based drug manufacturer Syntex Corp. recently made a surprising—some would say alarming—discovery after taking a hard look at the use of PCs in the company's business units.

More than 25% of Syntex's employees already had PCs on their desks, and the number was growing as the company's PC-related spending ate up an increasingly large share of its IS budget. But that wasn't the surprise. Like Syntex, most large companies today are spending more and more on PC hardware and software and associated technologies in support of end-user-based applications. A recent study by management consultants Nolan, Norton & Co., Lexington, Mass., estimates that on the average, corporations will soon be spending 40% of their IS budgets on end-user technologies.

The surprise for Syntex was the realization that an increasing number of applications, written by its autonomous business units and running on its mix of Macs and IBM and Digital Equipment Corp. PCs, were becoming so central to its business that their failure could have a quick and direct impact on the company's bottom line. We're not talking spreadsheets and word processing here. We're talking about custom PC-based systems that were doing everything from monitoring and controlling lab procedures to compiling and communicating vital drug testing information to government agencies such as the Food and Drug Administration.

The alarming part came when Syntex officials discovered that some of those PC-based, critical applications were being built and implemented without much concern for the type of basic controls that most central IS types take for granted. No standard development methodology or validation procedure. No documentation. No backup, recovery, or security.

Syntex decided to do something. "We started with the idea that [business unit managers] must have the responsibility to be sure that the company is getting the type of payoff it expects from these systems, and that they are doing what they are supposed to be doing," explains Helen E. Peters, director of office information services for the company. "We have said, 'If you choose to have this system developed by your own people, you, Mr. Businessman, are going to be accountable for certain things.' "

Before they were finished, Syntex's IS planners had made some dramatic changes in the way the company manages end-user-based applications. A task force

manages end-user-based applications. A task force consisting of business unit managers, PC managers, and central IS put together a set of guidelines that defines company-critical applications and mandates controls for which business unit managers are responsible. And Syntex went further, abolishing its outmoded information center in favor of putting more development expertise directly into business unit IS organizations and encouraging them to involve end users, representatives from other divisions, and central IS in a team approach to developing and implementing PC and other end-user-based systems (see "Syntex's System Commandments").

"We've had to take a more organized approach to end-user computing now that we're moving from counting beans with it to actually running the business on it," says Peters.

Syntex isn't the only large company trying to exert more coordination and control over PC-based applications. As divisions, departments, and business units continue to increase PC spending and to build more company-critical applications around PCs, most companies are looking for a new and better way to manage the development and support of those systems. They are putting an end to the often ad hoc, disjointed approach to PCs that evolved in the early to mid-1980s.

This second-wave approach to PC-based systems has companies insisting not just that business units adhere to technical standards, but that they also conform to standard development methodologies and consciously link these new applications directly to specific business objectives—not just to some vague notion of personal productivity.

"We're now over the initial phase of end users saying, 'I need to have a PC to be somebody,' " says Jim Miller, vp of MIS at of Richmond-based James River Corp. of Virginia, another company that is reevaluating how it manages PCs. "Now many end users are at the point of saying, 'We didn't get it quite right the first time around.' We're all realizing we've got to get a lot smarter about how we manage PCs," remarks Miller.

The questions Miller and many others are asking are already profoundly changing the roles, responsibilities, and challenges for every player in the PC game:

• Central IS, which in the past has played a spectator's role in PC-based, end-user computing, is now beginning to assert itself by setting standards and, in many cases, actually controlling development, implementation, and support of company-critical, PC-based applications. The challenge for IS is to take a more active role without stifling what has become the valuable hallmark of the PC revolution—providing locally controlled, quick solutions.

• Business unit technical support groups are taking a much more active role in planning and developing end-user-based applications with an eye toward companywide business objectives. Many companies are shutting down centralized information centers and making a conscious effort to seed business unit IS teams with seasoned professionals who are familiar with a wide range of platforms and technologies, not just PCs.

• End users are being asked to take more responsibility for seeing to it that the applications they are demanding conform to companywide architectural and business goals. And they are becoming active partners in team approaches to PC-based application development. Already, according to market researcher Input of Palo Alto, 50% of the companies it interviewed report that end users are developing production systems. And half of those companies said end users would be responsible for more than 25% of all their new applications in 1988.

JAMES RIVER'S MILLER: Many users are saying, "We didn't get PC management quite right the first time."

Photograph by Art Stein

• PC vendors often are looking at longer selling cycles and an increased demand for service and support as many companies that are focusing on company-critical PC applications look to offload responsibility for well-established task automation applications such as spreadsheets and word processing. In some cases, vendors are seeing large companies temporarily slow their acquisition of new PC hardware and software as they search for new management approaches to company-critical PC-based applications.

Not coincidentally, many market watchers have begun to project a slowdown in what has in recent years been an ever more rapidly expanding PC market (see "The Coming PC Slowdown"). A recent survey of large corporations by DATAMATION and Cowen & Co. actually identified a decline in PC units shipped in 1988 compared to 1987. It was the first time the annual survey showed a drop.

PACBELL'S MILLER AND ZELLARS have related the cost-cutting results of their PC management study to other units, but aren't dictating policy changes.

Photograph by Jeff Renkung

While most analysts are slightly more optimistic, most are predicting a moderating growth trend in 1988 and 1989. Many observers are attributing the flattening demand trend to user confusion over new and competing PC technologies and to PC prices that are being kept high by component availability and other factors. As memory shortages begin to ease, and lower-priced 80386SX-based systems become available later this year, followed by 80486-based systems sporting two-times-386 performance, many analysts are predicting a return to 20 +% PC demand growth in 1990 (see "Probing the Roots of PC Purchasing").

Others, however, say there's more to the PC demand pause than technology alone. The drive by many large companies to find a new model for managing end-user-based systems, they say, also is having an effect on PC demand. According to Art Benjamin, consultant and president of Toronto-based On-Line People, "The first pause in the PC market came around 1984 when people started asking whether PCs were actually helping productivity or just turning executives into typists. Now we've been seeing another one, as people question not only whether they need OS/2 or DOS but as they try to understand how to approach PC-based systems as they become more strategic."

Centralizing End-User Computing

One large company going through that process right now is California RBOC PacBell. The San Ramon-based utility recently completed a pilot study aimed at understanding how its operating units manage its menagerie of PCs and end-user systems and how the company can better coordinate planning, development, and support. The study eventually led one large PacBell operating unit in Alameda and Contra Costa counties to form a centralized end-user computing center with responsibility for applications development and support.

The end-user computing center immediately took control of the operating unit's data networking and office automation planning efforts and put on hold requests from several work groups for PC- and local area network-based OA systems. After a four-month study during which the center interviewed 20% of the operating unit's end users, it decided against going with PC-LAN solutions altogether, opting instead for a terminal-to-Unix system running on a new data-over-voice network linking the entire 2,500-person unit. The network is a PacBell-designed 9.6Kbps implementation called PBLan. The OA application will use commercial software running under Unix V version 3 on dumb terminals and a minicomputer from Arix Corp., San Jose.

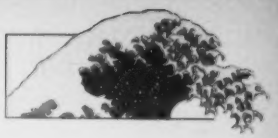
According to Kris Zellars, computing manager for the PacBell pilot project, going with a terminal-to-Unix approach instead of a PC-LAN solution will not only improve the business unit's control over end-user-based applications, but will also cut costs. Most users in the Alameda/Contra Costa business unit still use dumb terminals, and the new system will allow them to plug into new OA applications over existing phone lines.

"A lot of people thought they really needed PCs and LANs, and they weren't that thrilled with the solution we came up with," says Zellars. "But PCs and LANs get awfully expensive, and this way we can do everything a PC-LAN approach can do and stay within our overall architectural plan." Plans call for the new end-user computing center to control other critical projects.

The PacBell study was prompted in large part by growing upper management concern with the cost of PCs and end-user-based systems. PacBell now has about 25,000 PCs installed. According to manager of portfolio management Brian Miller, the company was worried not only about the cost of the hardware and software but also about support costs. Nolan, Norton has estimated it costs corporations about $18,000 per PC per year on average, with the largest chunk, 39%, eaten up by support costs.

PacBell management became convinced the company was paying plenty in under-the-table support costs as end users sought help from de facto local PC gurus who were being distracted from their real jobs. "There were lots of hidden support costs that there was no way to quantify," says Miller.

The second-wave approach is linking PC-based systems to specific business objectives.



Now PacBell hopes that other operating units, after studying the results of the Alameda/Contra Costa pilot project, will begin to make similar changes in their approach to PC and end-user systems. But PacBell isn't mandating the approach. For one thing, not all of its operating units are large enough to require such a formalized coordinating function. And, for another thing, PacBell, like most companies, is hesitant to begin taking a top-down, authoritarian approach to end-user computing.

"We've communicated the results of the study and said here are the key findings, but we're not dictating what they should do," says Miller. "If we were to do that we would still be treating it [end-user IS] as a unique venture. What we really want is for it to become integrated into the business."

It's not unusual for end users and local support groups who are used to lots of freedom in developing PC-based systems to rebel against more coordination and control coming from IS or high-powered PC swat teams. "Many end users have gained much more technical sophistication and they're saying 'we just don't need you anymore,'" says Sarah Kaull, associate director of the Partnership for Research in Information Systems Management, a research service of the Index Group and Hammer & Co., both of Cambridge, Mass.

End-user groups often are reluctant to give up control over their own IS destinies. And they don't like the idea of a project schedule stretching out as IS and others get involved in development, which can happen. At Merrill Lynch, for example, a massive trader automation project, running on 19,000 386-equipped IBM PS/2s, was taken over by IS, and it is just now going into its initial prototype phase, a year and a half after the project was initiated.

Syntex's System Commandments

Syntex Inc. recently put into practice a new set of policies intended to impose a standard set of management controls on company-critical, PC-based applications being developed and supported by the company's business units. The guidelines, developed by Syntex's central IS, its business unit IS groups, and central service organizations, attempt to define company-critical applications and the controls that must be applied to them. They also spell out who in the organization is responsible for what aspects of justifying, developing, and supporting these critical, end-user-based systems.

Company-Critical Systems

Syntex defines company-critical end-user-based systems as having any of the following traits:

- The system or its data is critical to the operation of the corporation or division. Failure or loss of data "would result in serious work disruption or significant financial impact."
- The application is time-critical.
- The system produces checks, purchase orders, warrants, or other negotiable documents.
- The system contains sensitive information such as trade secrets, personnel data, or formulas.
- The system must comply with regulations such as generally accepted accounting practices or good laboratory practices.
- The system contains data that is subject to examination by regulatory agencies such as the Food and Drug Administration.
- The system contains data with a requirement for long-term archival storage, such as the results of clinical studies.
- The system feeds data to other systems that have the above traits.

Controls

End-user-based systems qualifying as company-critical must be developed and supported with certain specific controls. They are:

- A consistent systems development approach that includes provisions for testing to determine whether the system is doing what it was designed to do. The system also must be consistent with other databases in the company.
- A system notifying users when any changes in the system are planned and for testing the effect of those changes on live databases. Also, a system for testing the cost/benefit of running new versions with existing versions for any given time.
- A system for validating compliance with formal procedures such as good laboratory practices.
- Formal documentation so that a system can survive the departure of its creator.
- Means for securing the physical system, data storage media, sign-on, file systems, and printed information.
- Formal backup and recovery procedures.
- Training at least two people in the operation and maintenance of any critical system.
- A formal system for justifying and coordinating hardware and software acquisitions that includes a definition of the scope and purpose of the system, its business benefits, and a cost-benefit evaluation.

Responsibilities

Syntex's document describes the responsibilities various organizational entities have in ensuring that company-critical systems are developed with the required controls:

- Division general managers are responsible for ensuring compliance with the guidelines and for providing resources to support the company-critical information systems.
- Line managers in business units are responsible for identifying company-critical end-user-based applications. "Line managers are accountable for the decision as to whether applications will be developed and maintained by their own department staffs or by an outside information systems department. Regardless of how the system is developed, responsibility for compliance . . . rests with line management," the guidelines state.
- User-developers must implement the controls outlined in the guidelines at the direction of line managers.
- End users are accountable for the decisions they make using system-generated information.
- IS is responsible for developing procedures to implement the guidelines, including educating line managers "on the risks of developing systems without appropriate controls," the document states.

"Taking the time and effort to build systems in a prudent manner may increase the perceived cost of system development and operation. It is important, however, for managers to realize that ignoring risks is not an acceptable alternative, since the hidden costs of system failure or malfunction must be considered," the guidelines say.

"Taking a more comprehensive approach to end-user computing does take more time, and we've had to explain that to a lot of users who sometimes have false expectations," says PacBell's Zellars. "Sometimes they do get impatient with the process, though."

Many of those pushing for a second-wave approach to PC management say the last thing they want is to put roadblocks up in front of end-user IS development. "But it's a fine line," says E. Sheldon Gregory, information services customer support manager for San Francisco-based Bechtel Power Corp., which is also trying to take a more coordinated approach to managing its 2,720 Macs and IBM PCs. "We don't want to try to control [end-user computing] too much, because then we'll lose it. But we do need to end some of the inefficiencies. We don't need people in each operating company evaluating Lotus, dBase, and Oracle. And we don't need to be using lots of different user interfaces," according to Gregory.

> We don't want to try to control end-user computing too much, because we'll lose it. But we do need to end the inefficiencies.
>
> E. SHELDON GREGORY
> BECHTEL POWER

Benefits of a Coordinated Approach

Bechtel has formed a couple of task forces to develop companywide end-user technology standards and to identify and focus resources on company-critical PC applications. The latter effort, called the Partnering Task Force, is composed of representatives from IS, each of Bechtel's operating companies, and companywide service sectors such as finance. The group is developing critical PC-based applications in part to demonstrate to Bechtel's business units what can be accomplished with a coordinated approach to end-user systems. "MIS has a lot to bring to this arena, but we need to show value added. We need to have some winners," says Gregory. "We're in a 'show me' environment."

So far, the Bechtel partnering group has developed two executive information systems. One custom EIS—for Bechtel's executive committee—based on the Command Center software package from Pilot Executive Software, was rolled out in nine months.

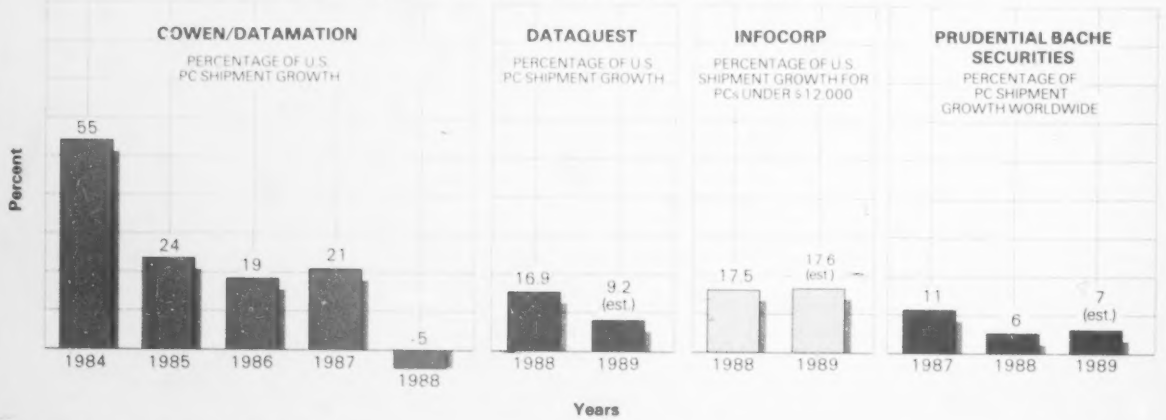
Gregory says that soon Bechtel will turn the partnering task force into a permanent organization under IS to manage corporate planning and reporting of end-user-based systems. In addition to EIS, the group will also focus its attention on videotex and text management applications.

According to some IS executives pushing for a more coordinated approach to end-user computing, one key is to recognize that end users have gained plenty of expertise and experience since the PC revolution started in 1981. "We have to realize that we [MIS] are not the only experts now," says Syntex's Peters. "The end users bring plenty of knowledge, and we have to recognize that. In fact, we're finding the early PC adapters are learning some of the same lessons that we in MIS learned years ago, like the need for backup and audit trails."

While some corporations are attempting to set examples and gently convince business units to cooperate with common, enterprisewide approaches to end-user computing, others are taking a more aggressive approach. Paper and packaging manufacturer James River Corp., for one, is experimenting with greater IS influence over critical PC-based applications development. For example, the company's MIS department is in the first phase of developing a PC-

The Ebbing First Wave

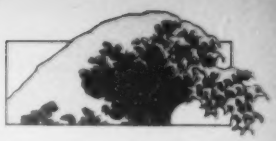
Most market researchers predict that companies will slow their acquisition of new PC products as they search for new management approaches to company-critical PC-based applications.



Source: Cowen & Co., InfoCorp, Dataquest, and Prudential Bache

Chart by Paragraphics

Some firms are more aggressive in controlling and coordinating their end-user systems.



based production scheduling system that will tie together eight paper mills and sales and customer service departments. Miller acknowledges the changes he's making will, in many cases, cause PC-based developments to take longer getting off the ground, but he says it's worth it.

"Historically, our PC-based applications have been largely user-driven, with users providing the expertise themselves," says Miller. "But, in recent years, there's been a ground swell of discontent from users. There's a feeling that there's been a proliferation of PCs but not a proliferation of good solutions." That is true particularly as end users get more ambitious with their PC-based applications. "Many are reaching critical mass and turning to the MIS group for help," says Miller.

If getting IS more involved and enforcing a more disciplined approach to PC-based applications development means projects take longer to get implemented, that may not be all bad, says Miller. "The premise has been that if you're going slow, you're doing something wrong. I'd want to test that idea. I'm not sure it's right," says Miller. "Formalizing the process may end up helping users more than slowing things down."

That's not to say that Miller is pushing for IS to become an authoritarian force over all end-user-based projects. In fact, rather than disbanding its information centers as some companies are doing, Miller is pushing to upgrade technical expertise at the company's three information centers so they can take on development projects involving a wide range of technologies, not just PCs. James River is adding de-

Probing the Roots of PC Purchasing

Recent user surveys and analyst projections have begun to show that while businesses still plan to buy more PCs this year than last, the rate of growth is slowing, particularly compared with dynamic growth spurts seen in 1984 and 1985 (see "The Coming PC Slowdown"). But the experts don't agree on how much growth is slowing or why.

Market analysts such as Dataquest Inc. and InfoCorp project growth in the number of microcomputers sold to slow to between 9.2% and 12.5% in 1989 from a 16.9% jump in 1988. Securities analysts such as Prudential-Bache expect units shipped in 1989 to grow 7%. These figures contrast sharply with the 35% growth rate in 1984 and 127% in 1983. Even the growth projections of PC market bulls such as Compaq Computer Corp. are lower than in the recent past. The 1989 growth of 15% to 20% that Compaq predicts for its high-end products would be down from the larger-than-expected 30% growth Compaq saw last year, according to marketing vp Mike Swavely. Of course, as the number of PCs shipped in any given year becomes larger—about 16 million in 1987—it becomes more difficult for the PC industry to sustain a steep growth rate. But analysts see other reasons for the apparent moderating trend.

Analysts who have a PC product orientation assert that the recent proliferation of important new PC technologies such as 386SX, OS/2, Micro-Channel Architecture, and Extended Industry Standard Architecture (EISA) has users confused and waiting for the smoke to clear. "Users have been somewhat awed by all the new technology, but we believe the availability of significant numbers of 386SX machines will fuel growth of the 32-bit market in 1989," says InfoCorp PC analyst Stella Kelly.

Others see the PC market as a winded runner ready for a breather. The market has been growing so fast for so long, "it seems like people are predicting one just because they think there should be one," says Dataquest industry analyst Robert Charlton. Others think users are waiting for vendors to offer better PC deals before picking up the purchasing pace. "From September to September we've seen virtually no price/performance improvement at all, largely because of the DRAM shortages," says Prudential Bache analyst Kimball Brown. As a result, buying hit a wall mid-year.

But, says Brown, demand is still there, and the market will come back with a vengeance in mid-1989 when systems based on Intel's lower-cost 386SX microprocessor begin to ship. At that point, 386-based systems now costing $4,500 will drop to about $3,000, says Brown. Demand will rebound further in 1990—back to 25% annual growth—when systems based on Intel's 486 microprocessor double the price/performance of 386-based systems and when new, blockbuster applications for OS/2 emerges.

SYNTEX'S PETERS: Buys large quantities of PCs for implementing company-critical projects.

At the same time, others note the slowing effects that user efforts to control and coordinate their management of end-user-based, company-critical systems can have on PC-based development. "The kind of issues companies are facing now are much more difficult, more time-consuming," says Paul Saffo, an analyst with the Menlo Park, Calif.-based Institute for the Future. "The easy stuff like word processing has all been done. We're at the point where organizational issues become the obstacles."

While many users report that facing those issues is leading them to slow end-user- and PC-based development, in the long run, large company-critical PC-based systems will account for plenty of the PC market's growth. "When we do buy PCs for these company-critical projects, it's in large numbers," says Syntex Inc. director of office information services Helen E. Peters.

Photograph by Rick Browne

velopment experts who have experience with environments such as VM, 3270 data transfer, and COBOL, as well as its 386-based PCs, at its three information centers in Richmond, Norwalk, Conn., and Oakland, Calif.

"We want to get users away from the idea that all they need to know about are PCs," says Miller. One of the problems, he says, is that users often tend to reach for the same solutions, regardless of the problem. "If all you've got is a hammer, everything looks like a nail," he says.

Trading Autonomy for Coordination

While some end users may have misgivings about trading autonomy for more coordination and control, many seem to see the value of a new approach to PC-based systems. One such user is John Taylor, manager of sales systems in Syntex's sales organization. He says the biggest impact on him has not been Syntex's focus on development disciplines such as security for end-user systems. The biggest change, he says, has been in the push toward a team approach to new PC-based projects. "It's definitely becoming more common as it becomes more successful," says Taylor.

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>
> JIM MILLER
> JAMES RIVER CORP.

Taylor recently was involved in developing a critical, PC-based inventory control system designed to satisfy FDA regulations on drug companies' distribution of free samples to physicians. The planning and development was done by a team from central IS, sales tech support, technical people from other business units, and end users. The consensus approach created some disagreements between the various factions and added about 12% to the overall development time. "But," Taylor says, "we now have a more comprehensive design that is more flexible to changing business needs. People need to realize that the greater good is to end up with a better system."

The focus on new approaches to critical PC-based projects is also changing the ground rules for vendors in the PC market, particularly those selling software solutions. They face longer selling cycles. And sometimes it's not obvious who in an organization they should be selling to as their customers take more coordinated, team approaches to PC-based applications.

According to James A. Perakis, president and CEO of PC-based financial reporting software maker IMRS Inc. of Stamford, Conn., "Just a couple of years ago, the primary motivation for our customers was to break from MIS. They wanted to do their own systems in their own way." But that's all changing fast. "Now when we go into a sales situation, very often MIS is right in there as part of the evaluation team, along with the end-user organization—usually finance—and a consultant. Usually we spend some time trying to figure out who's taking the lead role. The surprising thing is that today, as often as not, it's a young MIS guy, under 30, throwing his weight around at these meetings," says Perakis.

As corporations turn their attention more to company-critical, PC-based applications, vendors also are being asked to take on more of a service and support role, particularly when it comes to more generic applications such as word processing. One large company, Rochester-based Eastman Kodak Co., is said to have recently asked vendors to bid on a project to manage most of its generic, standalone PC applications. Businessland, Centel, and IBM are said to be among the bidders.

One vendor focusing on that kind of business is Corporate Software of Boston. Besides selling software packages for PCs, Corporate Software will, for an additional charge, coordinate a user's PC hardware and software portfolio and support activities. "Lots of companies would rather just write a check for that and focus their attention on more strategic, custom applications," says Corporate Software marketing vice president Vince Kelly. Not all PC vendors see the new-wave, coordinated approach to company-critical applications significantly changing their market or slowing growth. Mike Swavely, marketing vp for leading IBM PC-compatible vendor Compaq Computer Corp., says most of Compaq's hardware business will continue to come from task automation-type applications, not company-critical, business automation projects. And the responsibility and control of projects will continue to come from the departments and business units, Swavely says. To the extent Compaq is preparing for a new approach to company-critical applications, it is through new products such as the Extended Industry Standard Architecture bus the company is promoting as an alternative to IBM's Micro-Channel Architecture.

Other observers, however, have very little doubt that large companies are changing their approaches to end-user computing rapidly and that it means more coordination and control, not less. Analysts such as Nolan, Norton, in fact, see the new wave of PC development approaches as only part of a long-term trend that will, in the 1990s, see companies using end-user computing to alter their basic business organizations fundamentally and receiving 10-fold returns on their PC investments, not just the 10% to 20% most see today. Companies such as James River are planning for that today. According to Miller, the company has begun studying what kind of basic organizational efficiencies it could expect if end-user-based systems could provide workers more complete, practical information. "We could get by with two levels of employees. One guy to run the mills and one guy to run the machines," says Miller.

Right now, however, IS planners at most large companies seem to have their hands full just catching up with their own business units. "We've already taken that leap of faith and bought lots of PCs," says Bechtel's Gregory. "Now we're just trying to figure out what's going on out there with all of them." ▭